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The discussers congratulate the author for his clear and concise description of the closure problem applied to jet scour in plunge pools. The set of equations has been solved by assuming that the drag forces exerted by the fluid on the bed particles are correlated with the near bed velocity u_b and the Chézy roughness coefficient. The former is defined as a function of jet shape at impact, the approach flow jet velocity U_1 , jet thickness b_1 and a coefficient α . Using Shields criterion, a critical shear stress is defined for the bed, which finally allows computing the maximum scour depth.

Although several qualitative criteria for turbulence effects on the initiation of particle movement have been studied in the past and are introduced in the author's approach, his procedure strictly retains a quasi-steady character and no real turbulence effects are incorporated by means of physical parameters. Also, quasi-steady drag forces on rock blocks depend on the local block shape when compared with its surroundings, which is difficult to define. As such, the discussers have the following questions regarding the accuracy and application of the author's approach:

1. Which Ψ values had to be used (calibrated) to match the theoretical model with both laboratory and prototype scour data? Were these values consistent?
2. Several α factors are integral part of the model equations. What is the global error on the estimates of these parameters

and what would be the effect of this global error on the scour depth estimate?

3. A real jet is rarely plane or circular. The bottom velocity depends directly on the jet shape at impact. Based on Bohrer *et al.* (1998), the jet velocity decay strongly depends on the degree of jet development in the air. What are their errors on the scour depth?

Furthermore, the author correctly states that his method also works if the effects of fluctuating pressure and the rock characteristics are included. The discussers would like to state major difficulties in doing this, including the following:

1. The unknown G was determined by assuming the scour hole shape, which may become invalid if applied to a real rock mass, with complex 3D fracture patterns that often result in complex scour hole shapes.
2. The use of a critical block stability factor accounting for quasi-steady and turbulent forces that act on a rock block in a plunge pool is complicated to solve. Block stability depends not only on these near the pool bed (Bollaert and Hofland 2004) and the geo-mechanical characteristics of the rock mass, namely block shape, height, side length, density or fissure orientation to the flow, but also on the direct interaction between turbulence and the rock mass characteristics.

